

REMARKS/ARGUMENTS

Claims 1-21 are active. Claims 14-21 are Withdrawn.

The claimed invention is directed to a method as described in Claim 1 and claims dependent thereon, for the production of an upgraded coal which does not use hydrogen gas.

Applicants wish to thank Examiner Zhu for the indication that the rejection of Claims 1-3 under 35 U.S.C. 112, first paragraph, is withdrawn.

The rejection of Claims 1-13 under 35 U.S.C. 103(a) over Brink et al. (U.S. 4,045,187) in view of Miller (U.S. 4,617,105) is respectfully traversed.

Brink describes a process for the manufacture of coke by deoxygenation and removal of water comprising heating the carbonaceous material in intimate contact with a liquid solvent, a hydrogen carrier and hydrogen under pressure. (Claim 11 in pertinent part) Miller describes an improved process for thermal solvent refining or hydroliquefaction of non-anthracitic coal at elevated temperatures under hydrogen pressure in a hydrogen donor solvent (Abstract).

The Office continues to allege that Miller teaches nitrogen and hydrogen pressure in a coal extraction process are functionally equivalent (Official Action dated September 9, 2009, page 3, lines 13-20):

. . . , the Examiner notes that Miller ('105) discloses that the atmosphere during the extraction step can be air or an inert gas, e.g., nitrogen or helium at atmospheric or elevated pressures . . . ; and a process for thermal solvent refining or hydroliquefaction of non-anthracitic coal at elevated temperatures under hydrogen pressure in a hydrogen donor solvent . . . , clearly suggesting that a hydrogen pressure and a nitrogen pressure . . . in a coal extraction process are functionally equivalent.

Applicants totally disagree and point out that the description of Miller cited by the Office states:

The atmosphere during the extraction step can be air or an inert gas, e.g., nitrogen or helium. The extraction can be done either in a batch process or continuously.

The extracted coal may be transferred from the extractor to the liquefaction reactor under pressure, . . . **If the extraction was done under an inert atmosphere, hydrogen can be added to the feed before transfer to the hydroliquefaction reactor or can be added directly to the liquefaction reactor.** (Bold and underlining added for emphasis)

As Applicants have previously asserted, Miller only shows **equivalency of nitrogen and helium** as inert gases in the cited text.

Miller describes the function of hydrogen in the coal liquefaction process as follows (Col. 1, line 52, to Col. 2, line 2):

. . . The intermediate free radicals, resulting from cleavage of carbon-heteroatom and carbon-carbon bonds, are **hydrogenated during liquefaction to prevent polymerization** of the thus-produced free radicals to high molecular weight structures.

Although **hydrogen performs the necessary function of hydrogenation in coal liquefaction**, it has been found that introduction of hydrogen by a hydrogen donor solvent is preferable to use of gaseous hydrogen alone. Hydrogen donor solvents must dissolve the products from coal liquefaction and must be capable of reversible hydrogenation and dehydrogenation. The donor solvent therefore functions as a hydrogen carrier, upon which hydrogen is loaded and introduced into the reaction mixture. Hydrogenated donor solvent then transfers hydrogen to free radicals generated during coal liquefaction and the **hydrogen depleted solvent is separated from the products and is rehydrogenated** before recycling to the coal liquefaction reaction. (Bold added for reference)

Clearly, Miller describes the necessity for hydrogen, a hydrogen donor solvent and recovery of the solvent by hydrogenation. An inert gas such as nitrogen cannot provide such reductive chemistry. Therefore, Applicants respectfully submit that substitution of nitrogen for hydrogen as the Office suggests, would render the Miller process inoperable because nitrogen would not replenish the hydrogen donor solvent.

The proposed modification cannot render the prior art unsatisfactory for its intended purpose (MPEP § 2143.01 V.)

Likewise, Brink describes a process which comprises (Col. 2, lines 32-35:

. . . heating the carbonaceous material in intimate contact with a liquid solvent and a hydrogen carrier and hydrogen under pressure to effect deoxygenation, . .

In contrast, hydrogen is not added to the slurry preparation tank or the aging tank and the organic solvent is not rehydrogenated in the process of the claimed invention.

Applicants respectfully submit that as clearly described by Miller, hydrogen is not an inert gas as is nitrogen. Hydrogen reduces free radicals formed and prevents polymerization.

Applicants respectfully call the Examiner's attention to the following excerpt from the Office's own discussion of "**Examination Guidelines for Determining Obviousness Under 35 U.S.C. 103 in View of the Supreme Court Decision in *KSR International Co. v. Teleflex Inc.***"

"The rationale to support a conclusion that the claim would have been obvious is that **all the claimed elements were known in the prior art** and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded nothing more than predictable results to one of ordinary skill in the art at the time of the invention. ""[I]t can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does." **If any of these findings cannot be made, then this rationale cannot be used to support a conclusion that the claim would have been obvious to one of ordinary skill in the art,**" (Federal Register, Vol. 72, No. 195, page 57529) (Bold added) (Citations omitted)

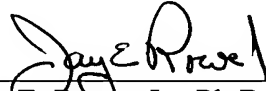
As described above, both cited references require hydrogen in extraction and/or liquefaction; therefore, the combined references do not describe all the claimed elements of the present invention. Therefore, according to the KSR guidelines above, a conclusion of obviousness cannot be supported and as the cited references cannot render the claimed invention obvious, withdrawal of the rejection of Claims 1-13 under 35 U.S.C. 103(a) over Brink in view of Miller is respectfully requested.

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Applicants respectfully submit that the claimed invention is now in condition for allowance and early notice of such action is earnestly solicited.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,  
MAIER & NEUSTADT, P.C.  
Norman F. Oblon



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Jay E. Rowe, Jr., Ph.D.  
Registration No. 58,948

Customer Number  
**22850**

Tel: (703) 413-3000  
Fax: (703) 413 -2220  
(OSMMN 08/07)